

Claims

5

The claims defining this invention are as follows:

- A method of activating and metallising an aromatic polymer film including the steps of:
 - pre-treating a first surface of the film with a basic solution;
 - following the pre-treatment step, applying to said first surface of the film an aqueous seeding solution comprising polymerstabilised catalyst particles; and
- then immersing the film in an electroless plating bath comprising ions of a desired metal so as to deposit a layer of said metal onto the first surface of said film.
 - The method of claim 1, wherein the basic solution is a solution of potassium hydroxide.
- The method of claim 1 or claim 2, wherein after the basic solution treatment step, an acidic solution is applied to said first surface.
 - 4. The method of claim 3 wherein the acidic solution is a solution of protic acid such as hydrochloric acid (HCI) or acetic acid.
- The method of any one of claims 1 to 4, wherein the aqueous seeding
 solution comprises polymer-stabilised palladium particles.
 - 6. The method of any one of claims 1 to 5, wherein the catalyst particles are stabilised by a water-soluble polymer.
 - 7. The method of claim 6, wherein the water-soluble polymer is polyvinyl pyrrolidone (PVP) or polyvinyl alcohol (PVA).
- 25 8. The method of claim 7, wherein the water-soluble polymer is PVP.
 - 9. The method of any one of claims 5 to 8, wherein the palladium particles have diameters of from 1 to 50 nanometers.
 - 10. The method of any one claims 1 to 9, wherein the desired metal is selected from the group consisting of nickel, copper and gold.

WO 03/102267 PCT/SG03/00136

10

- 11. The method of claim 10, wherein the desired metal is nickel or copper.
- 12. The method of any one of claims 1 to 11, wherein the basic solution is applied by immersing the film in a bath of the basic solution.
- 13. The method of any one of claims 1 to 11, wherein the basic solution is applied by spraying a layer of the solution onto the first surface of said film.
 - 14. The method of claim 12 or claim 13, wherein the film is maintained in contact with the basic solution for 1 to 15 minutes after which the basic solution is washed off.
- 10 15. The method of any one of claims 1 to 14, wherein the aqueous seeding solution is applied by immersing the film in a bath of the seeding solution.
 - 16. The method of claim 15, wherein said immersion is for a period of from 5 to 60 seconds.
- 15 17. The method of any one of claims 1 to 16, wherein, after application of the aqueous seeding solution, the film is washed with de-ionised water to remove excess catalyst particles.
- 18. The method of any one of claims 1 to 17, wherein after the depositing of the layer of the desired metal, the film is washed with de-ionised water and dried.
 - 19. The method of any one of claims 1 to 18, wherein after the depositing of the layer of the desired metal, the film is heated to improve adhesion between the film and the metal layer.
- 20. The method of any one of claims 1 to 19, wherein prior to the step of applying the basic solution, vias are formed, either substantially or entirely, through the film.
 - 21. The method of claim 20, wherein the vias are formed using laser drilling techniques.
- 22. The method of any one of claims 1 to 21, wherein prior to the step of applying the basic solution, photoresist material is applied to the film and

15

- said photoresist material is developed so as to facilitate patterning of desired circuity onto said film.
- 23. The method of any one of claims 1 to 22 wherein, prior to the step of applying the basic solution, the film is cleaned and dried.
- 5 24. The method of claim 23, wherein the cleaning is effected by ultrasonication in acetone and de-ionised water.
 - 25. The method of claim 24, wherein further cleaning is effected by ozone treatment at elevated temperature.
- 26. The method of claim 25, wherein the ozone treatment is conducted at about 80°C for between 3 and 10 minutes.
 - 27. The method of any one of claims 1 to 26, wherein the aromatic polymer film is formed of polyimide.
 - 28. A method of activating and metallising an aromatic polymer film substantially as hereinbefore described with reference to any one or more of the examples and the drawings.
 - A metal coated aromatic polymer film made according to the method of any one of claims 1 to 28.